

# Flowrox™ Slurry Knife Gate valves SKH (High pressure) DN80 – 600 (3"-24")

## Installation, maintenance and operating instructions



Read these instructions carefully and make sure to understand them prior to the installation, use, and servicing of this product. Keep these instructions for future use.

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### **READ THESE INSTRUCTIONS FIRST!**

These instructions provide information about safe handling and operation of the product.

If you require additional assistance, please contact the manufacturer or manufacturer's representative.

### **SAVE THESE INSTRUCTIONS!**

Addresses and phone numbers are printed on the back cover.

# 1 EU Declaration of Corporation



VALMET FLOW CONTROL OY  
Marssitie 1  
53600 Lappeenranta  
Finland

declares herewith under the sole responsibility of the manufacturer that the Flowrox slurry knife gate valve series SKH is in conformity with the European Community's Directive PED 2014/68/EU.

Categorization:  
Category I

Properties of fluid:  
PED Article 13 Fluid group 2

Conformity assessment procedure:  
Module A

Following harmonized standards has been partially applied:  
EN 12516-2:2014+A1:2021  
EN 1563:2018

The object of the declaration described above is in conformity with the relevant Union harmonization legislation: Machinery Directive 2006/42/EC: Annex IIB partly completed machinery.

As the product may be used as parts or components in machinery, we declare that this product must not be put into service until the relevant machinery into which it is to be incorporated has been declared in conformity with the provisions of the Machinery Directive.

Follow the valve installation, operating and maintenance instructions in this manual.

On behalf of Valmet Flow Control Oy  
In Lappeenranta, 28th November 2023

A handwritten signature in black ink, appearing to read 'Riku Salojärvi', is written over a light grey rectangular background.







Riku Salojärvi  
Senior Manager, Operations






## 2 Introduction

### 2.1 General safety instructions

The following symbols are used in this manual to highlight the parts requiring particular attention.

Hazard severity panels.

	 <b>DANGER!</b>
	DANGER indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.
	 <b>WARNING!</b>
	WARNING indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
	 <b>CAUTION!</b>
	CAUTION indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

SYMBOL	DESCRIPTION
	Risk to personal safety: Neglecting the safety measures can cause personal injury.
	Crushing hazard
	Read the operation and maintenance instructions: Read and understand the operation and maintenance instructions before using the product.
	Mandatory action symbol: Obey these instructions to prevent machine malfunctions.
	Forbidden action symbol.

Prevent accidents and ensure the valve's appropriate operation by complying with the installation, safety, and maintenance instructions in this manual. Installation and maintenance of the valve must be carried out by persons with appropriate training. Electrical installation work of the actuator must be performed by a qualified electrician.

Access to the IOM-manual must be guaranteed at all times at the place of operation of the valve. It is required to observe the IOM-manual in all work tasks for the valve.

Use personal protective equipment when performing any checks or maintenance operation for the valve (goggles, helmet, clothing and gloves). Always follow the factory safety regulations.

In case of any discrepancies between translations, the English version shall prevail.

See appendix C - General safety warnings.

### 2.2 Applications and purpose of use

Flowrox High Pressure Slurry Knife Gate valves (SKH) are intended for wet industry medium and slurry applications. They are bi-directional and are installed between flat flanges to shut-off or open flow within instructed temperature and pressure limits.

#### Restrictions on use for SKH valves

The valve must not be used to throttle the flow in any way, nor should the gate be left in partially opened or closed position as this will lead to premature failure.

The valve temperature and pressure range must not be exceeded. The temperature ranges are given in Table 1 for standard sealing seat materials. Check the pressure class from the valve type plate. Do not use higher pipeline pressure than rated for the valve.

**Table 1. Temperature ranges for SKH valves.**

Ring sleeve material	NR	NBR	EPDM
Max valve operating temperature °C (°F)	0 to +75 (32 to +167 °F)	0 to +100 (32 to +212 °F)	0 to +100 (32 to +212 °F)

## Using the valve in explosive conditions

This valve series is not designed for Ex-areas. For use in explosive conditions the valve must have the required Ex-classification/approval. For more information, contact Valmet Flow Control.

## 2.3 General description



### Principle of operation

Flowrox SKH valve is built with a cast body and features a heavy-duty stainless-steel gate as a standard structure. Removable ring sleeves on both sides of the gate provide a bi-directional bubble tight seal, with no metal parts in contact with the medium.

In the open position the two ring sleeves seal against each other in the centre of the valve, providing a full bore through which the medium can travel. There are some structural differences between valve sizes, but the main components are shown in the exploded view illustration.

Closing the valve forces the gate progressively down between the two mating ring sleeves, until it reaches the fully closed position. When the valve is fully closed, the ring sleeves push against both sides of the gate, effectively sealing and completely containing the line pressure. Any medium discharged between the ring sleeves during open/close strokes is collected to the valve body cavity and drained or flushed through the flushing ports. **Never use the valve with all flushing ports plugged.**

The gland packing is built in the upper part of the body. On every valve stroke, it lubricates the gate with silicone grease. Easier actuation and minimum wear are achieved.

	<p>The valve must not be used to throttle in any way, nor should the gate be left in partially opened or closed position as this will lead to premature failure.</p>
	<p>The gate speed may not exceed 25mm/s (1 in/s).</p>

## Mechanical structure

The SKH valve assembly consists of 3 major components, the valve, the mounting set and the actuator. The valve assembly can be delivered with different types of actuators, flange drilling and ring sleeve material alternatives. Alternative actuators are shown below, Figure 1. The valve exploded view, part lists are shown on Figure 2.

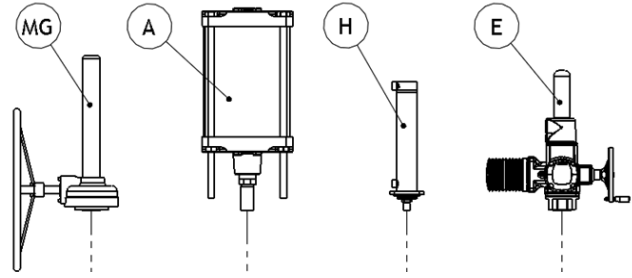


Figure 1. Alternative actuators.

Part	Description
MG	Manual actuator with gearbox
A	Pneumatic actuator
H	Hydraulic actuator
E	Electric actuator

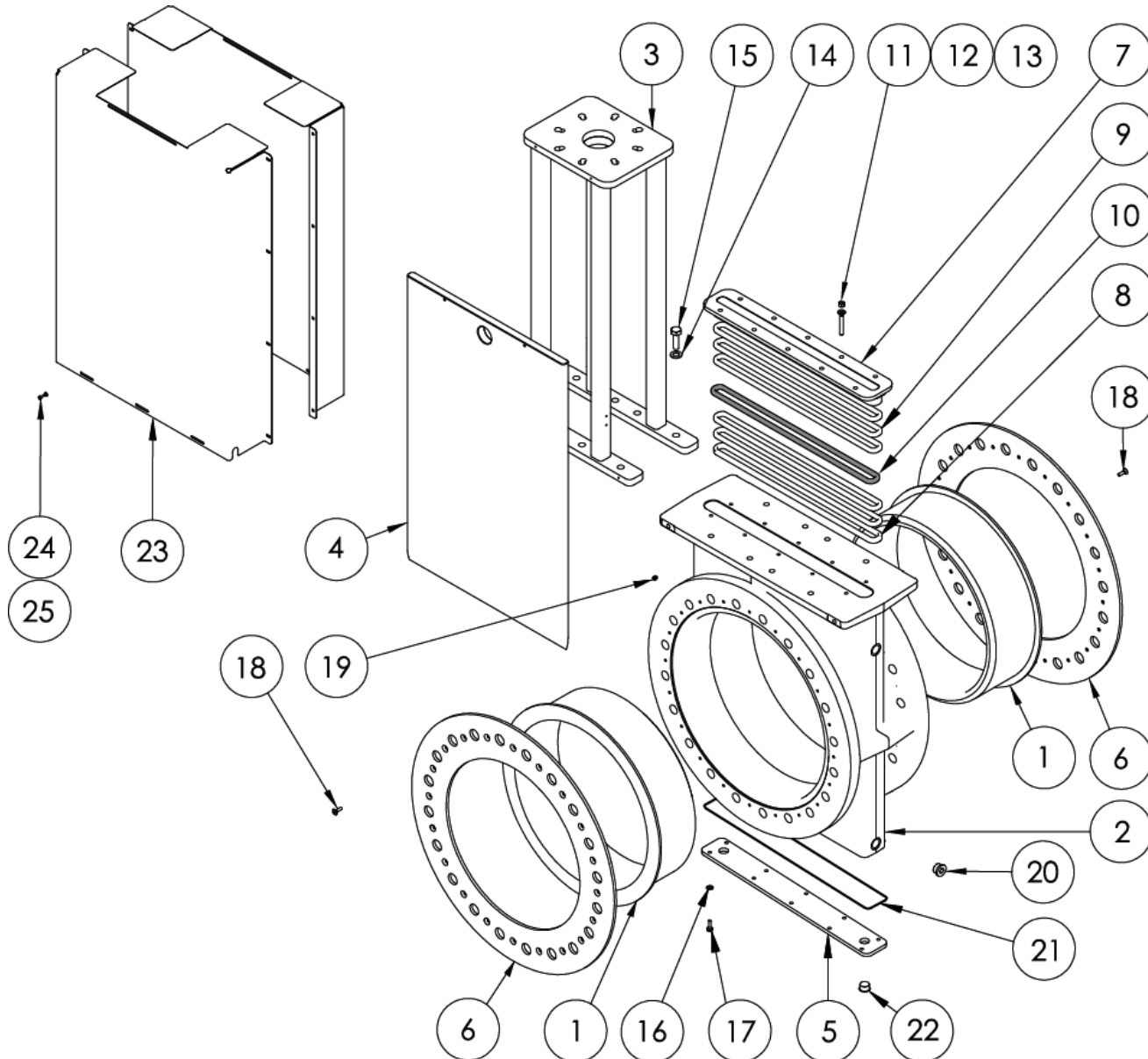


Figure 2. Exploded view of SKH valve.

Part	Qty	Description	Part	Qty	Description
1	1	Ring sleeve (recommended spare part)	16		Washer (bottom plate)
2	1	Valve body	17		Hex screw (bottom plate)
3	1	Tower	18		Countersunk screw
4	1	Gate	19	4	Grease nipple
5	1	Bottom plate	20		Plug
6	2	Ring sleeve retainers	21		Sealing strip
7	1	Gland retainer	22		Conical plug
8	1	Gland bush	23	1	Guard
9		Packing seal	24		Washer
10	1	Grease box	25		Hex screw
11		Threaded stud (gland retainer)			
12		Washer (gland retainer)			
13		Hex nut (gland retainer)			
14		Washer (tower)			
15		Hex screw (tower)			

## 2.4 Technical specification

Pressure range: 0 - 20 bar (0 - 300 psig).

Max. pressure differential: According to pressure rating indicated on valve name plate.

Temperature range: See section 2.2 Table 1. Indicated on valve name plate.

Flow direction: Bi-directional

## 2.5 Product identification

Flowrox valve name plate is shown in Figure 3.

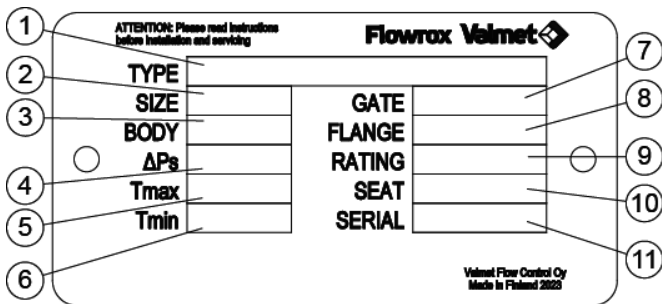


Figure 3. Valve type plate example.

1. Type designation
2. Size
3. Body material
4. Maximum shut-off pressure differential
5. Maximum temperature
6. Minimum temperature
7. Gate material
8. Flange drilling
9. Pressure rating
10. Seat material
11. Serial number

The main dimensions and weight are given in *Appendix A* of this manual.

## Actuators

### Manual

Manual gear operated valves are closed by turning clockwise.

### Pneumatic

Pneumatic actuators are with a fixed stroke and do not require external controls to position the gate. The pneumatic actuator is designed for a nominal supply of 6 bar (90 psi). In the case, other supply pressure is required, contact Valmet.

The air must be clean, dry, lubricated and properly filtered. An air quality of minimum requirement to ISO 8573-1:2010 [7:4:4] is recommended. If any component used on the valve has a stricter requirement, the stringent shall prevail.

	Use correct sized pneumatic hoses to ensure sufficient air flow.
	<b>CAUTION!</b>
	Noise hazard. Pneumatic actuator noise level can exceed 85 dB and cause an injury. Use ear protectors when working near the valve.

### Hydraulic

Hydraulic actuators have a minimum supply pressure of 150 bar (2250 psi). The recommended hydraulic fluid is mineral oil. For more information, refer to OEM datasheet.

### Electric

Electric actuators have open/close limit switches preset at the factory. A separate instruction from the actuator manufacturer is always included in the shipment.

Please consult the manufacturer's instructions on actuator requirements or/and limitations. If actuator is changed or valve needs adjustment, follow the *Maintenance* instructions.

	Ensure that the wiring connection is done properly to avoid any damages.
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### 3 Transportation, storage and lifting

Check and document any damages in the valve packages or valves. Contact the transportation company in case of damage. When new or unused valves are sitting idle for long periods, the following procedures should be complied with:

1. Prior to storage, thoroughly drain valves of all water.
2. Indoor storage is required. For unfavorable environment, cover the equipment with protective tarpaulin that will allow proper air circulation.
3. Protect the equipment from temperature and humidity extremes and exposure to excessive dust, moisture, vibration and sunlight.
4. It is preferred to store valves with the gate in the open position.
5. Avoid dirt and/or moisture contamination of the stem (threaded rod).
6. Ensure pneumatic and hydraulic cylinder actuators have appropriate pipe plugs installed in the respective supply ports to prevent contamination of the cylinders.
7. Protect valve ring sleeves from heat, light and exposure to ozone.
8. Cover the flange openings.
9. Do not store any objects on the rubber ring sleeves.
10. Follow the actuator instructions for storage.
11. Before start-up, clean the gate and lubricate the valve.

When storing used valves, wash the valve and the body cavities with fresh water and follow the steps above. For storage periods greater than 36 months, please contact Valmet Flow Control as the rubber parts need to be changed before use.

	Lifting equipment must be used for valves weighing over 25 kg (55 lbs).
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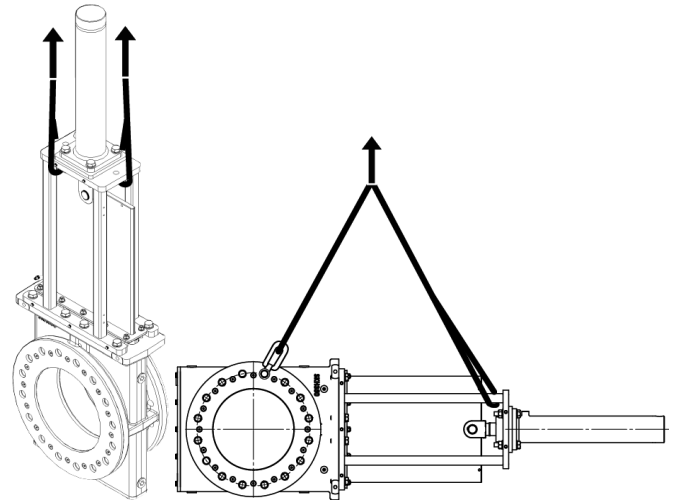



Figure 4. Valve lifting example.




Lift the valves securely from the tower (part 3 in *Mechanical structure*) and use pre-installed lifting eyes when available. When pre-installed lifting eyes are not available, use soft straps to lift valve as shown in Figure 4.



Do not attach lifting equipment to the valve bore, handwheel, actuator, locking pin holes or gate guards, as they can be damaged.


For valve dimensions and weight, refer to *Appendix A*.

	Remove the guard before lifting the valve.
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## 4 Installation

	 <b>WARNING!</b>
	<p>Crushing and cutting hazard.</p> <p>Do not put your hands or fingers into the tower or port areas when the valve cycles.</p> <p>Do not energize the actuator before the valve is properly attached to the pipeline.</p> <p>Disconnect and de-energize the actuator before installation and maintenance work.</p>
	<p>High pressure injection hazard.</p> <p>Do not use higher pressure than rated for the valve.</p> <p>Higher pressures can cause serious damage to the valve or harm to operating personnel.</p>

	 <b>CAUTION!</b>
	<p>Harmful substance hazard.</p> <p>If the process medium has to be fully contained, is corrosive or harmful, make sure the flushing ports are piped to a safe location.</p>

	<p>Never use the valve with all flushing ports plugged.</p> <p>Accumulated solids can cause the valve to jam.</p>
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### 4.1 General



Flowrox gate valves are normally delivered fully assembled and ready for use. The valve can be installed either way in terms of flow direction. Only personnel with appropriate training are allowed to install the valves. If the valve is delivered without an actuator or accessories, they must be installed in accordance with the manufacturer's instructions.

Flowrox gate valves have connections with DIN or ANSI bolt drillings as standard design, but other drillings are also available, such as BS, AS, JIS.

Reserve enough space for safe installation and maintenance. See *Appendix A* for valve dimensions. Notice that during opening and closing cycles, a small amount of medium is discharged in the valve body cavity; therefore do not install gate valves above walkways or critical components. Flushing or drainage connection must be installed if medium is harmful or corrosive.

If the valve has been stored in the warehouse, lubricate the valve as instructed in the *Lubrication* chapter.

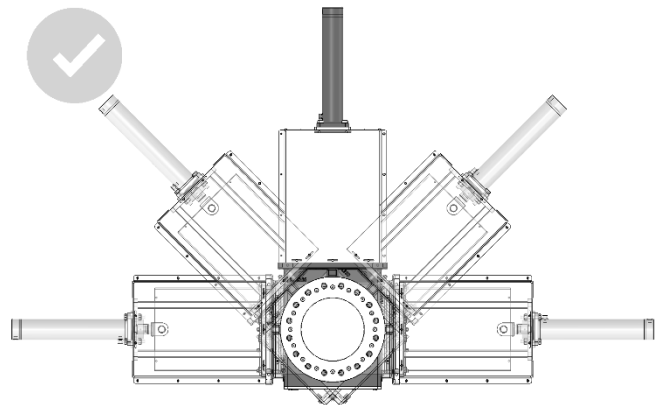
### 4.2 Flow direction, support, and valve position

	Do not install DN250 or larger valves in other than vertical position without support.
	Do not step on a valve installed in horizontal or angled position.

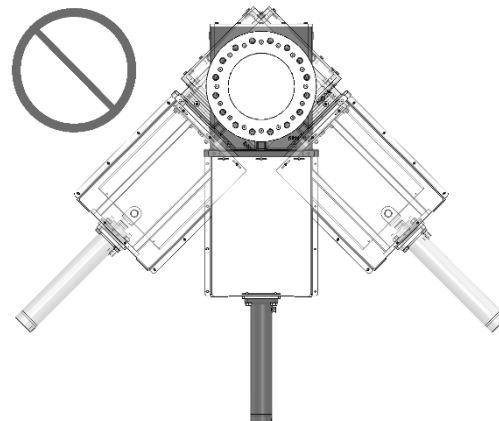
The valve does not have an intended flow direction; therefore it can be installed either way in the pipeline.

Proper pipe support must be placed on either side of the valve to support the weight of the pipe. The valve must never be used to support the pipes.

The valve can be installed in any position, but upside-down installation is not recommended.



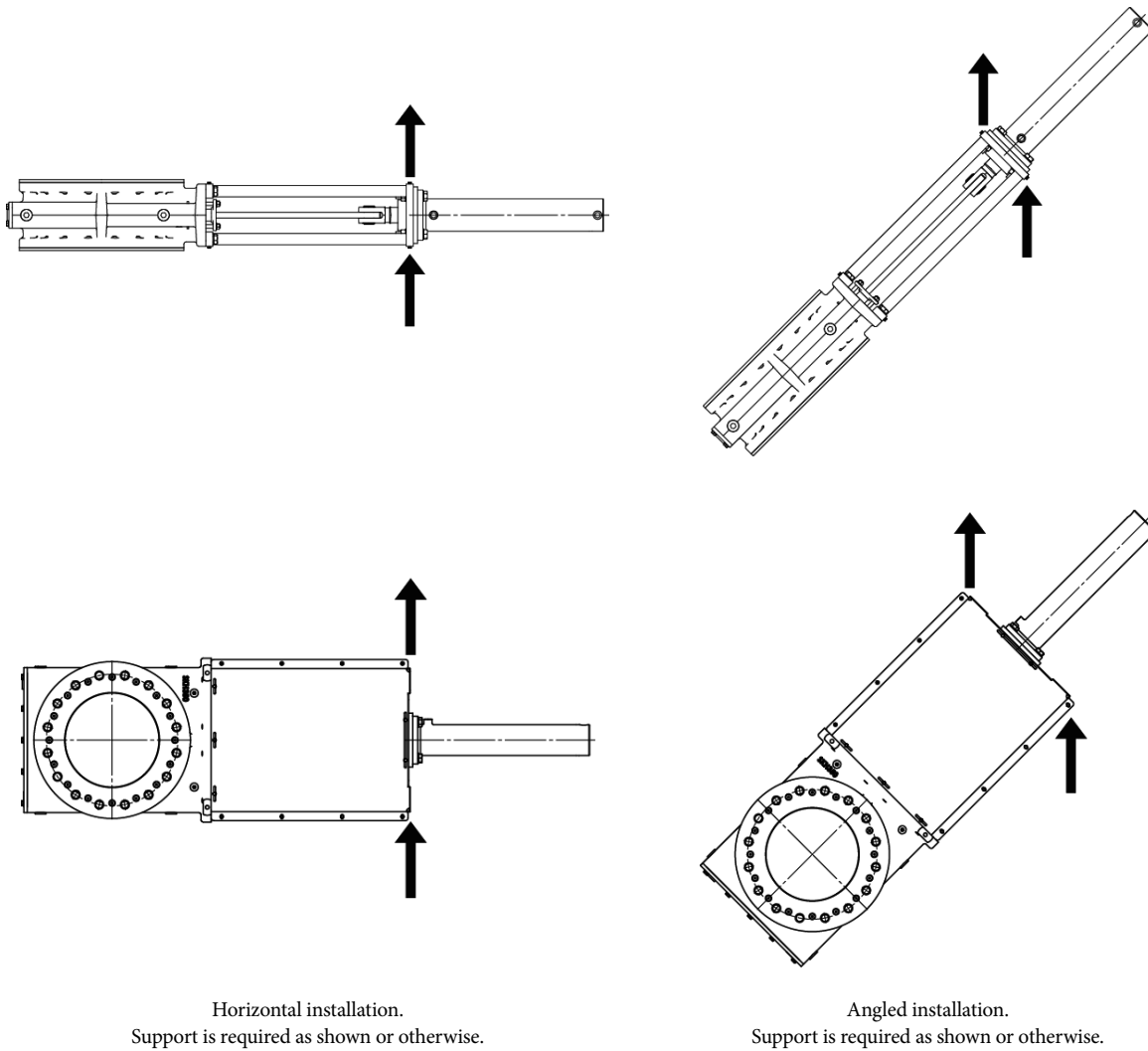
Recommended installation positions.



Upside-down installation.  
Not recommended.

**Figure 5. Support methods for valves.**

Valve sizes DN250 (10") and bigger require support if installed in other than vertical position. This is to prevent possible distortion of the actuator and valve tower. Installation and support examples are shown in Figure 6.



**Figure 6. Valve support alternatives.**

### 4.3 Valve installation

At least the following must be ensured before valve installation:

- The pipeline is isolated from the process and there is no pressure in it.
- The pipeline is empty, clean, and cooled down.
- The pipeline flanges are parallel, concentric and within correct distance.
- The flange connection bolts size is correct. Shown in Table 2.
- The required flange seals are available.
- The valve is in OPEN position.

Follow these Installation steps:

1. Disconnect automatic actuator from power supply if connected.
2. Lift the valve on place with appropriate lifting equipment.
3. Tighten the flange connection bolts evenly in a crosswise sequence as shown in Figure 7. Recommended tightening torque is shown in Table 2.
4. Follow the seal manufacturers' instructions. Other than mentioned flange drillings are also available.
5. Support DN250 and larger valves (Figure 6) if installation position is something else than vertical.
6. Connect automatic actuator to power supply.
7. Install flushing connection (if applied). Do not use valve with all flushing ports plugged.
8. Check that all connections have been fastened and the actuator is connected correctly.
9. Run a few open/close cycles without pressure in pipeline.



For electric actuator, close the valve manually halfway then operate electrically to ensure that the wiring is done properly.

10. Refer to *Troubleshooting* if the valve does not operate smoothly or without extra force
11. Tighten the gland packing seal if it starts to leak after the pipeline is pressurized. Make sure it is tightened evenly.



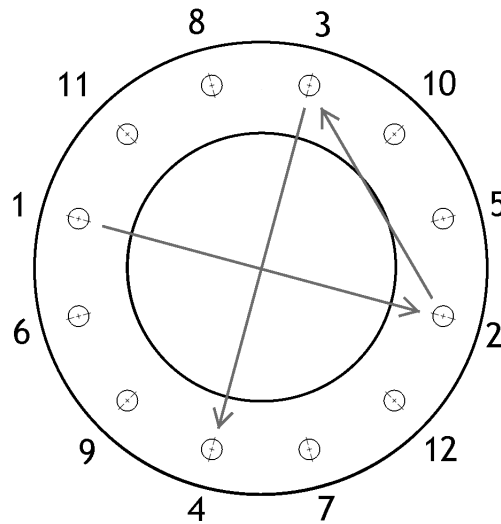
**WARNING!**

Crushing and cutting hazard.

Do not put your hands or fingers into the tower or port areas when the valve cycles. Do not energize the actuator before the valve is properly attached to the pipeline. Disconnect and de-energize the actuator before installation and maintenance work.

**Table 2. Flange connection bolt nominal diameter and tightening torque for steel flanges.**

Valve size DN (NPS)	Recommended tightening torque for flange bolt Nm (ft-lbs)	DIN Bolt nominal diameter	ANSI300 Bolt nominal diameter
<b>Bolt strength class 8.8 (Lubrication Conversion factor 0,86)</b>			
80 (3)	169 (125)	M16	3/4"-10 UNC
100 (4)	331 (244)	M20	3/4"-10 UNC
150 (6)	572 (422)	M24	3/4"-10 UNC
200 (8)	572 (422)	M24	7/8"-9 UNC
250 (10)	826 (610)	M27	1"-8 UNC
300 (12)	826 (610)	M27	1-1/8"-7 UNC
350 (14)	1127 (831)	M30	1-1/8"-7 UNC
400 (16)	1522 (1123)	M33	1-1/4"-7 UNC
450 (18)	1522 (1123)	M33	1-1/4"-7 UNC
500 (20)	1522 (1123)	M33	1-1/4"-7 UNC
600 (24)	1961 (1446)	M36	1-1/2"-6 UNC






**Figure 7. Flange bolt tightening example.**

## 4.4 Flushing installation guidelines

Flowrox gate valves must be flushed at least after every 20 cycles to keep the body clear of solids, depending on application and process. If slurry solids are present in the process, the flushing sequence needs to be initiated each time the valve is operated.

It is important to open the water supply valve a moment before the valve is operated. The flushing water is then left on for the entire cycle and for a minimum of 10 seconds after the cycle. To improve flushing, the water should be left on until clean flushing water is exhausting through the drain line.

	 <b>CAUTION!</b>
	<p>Harmful substance hazard.</p> <p>If the process medium must be fully contained, is corrosive or harmful, make sure the flushing ports are piped to a safe location.</p>
	<p>Never use the valve with all flushing ports plugged. Accumulated solids can cause the valve to jam.</p>

When valve flushing is required, customers will typically provide their own plumbing. Contact Valmet Flow Control office for process specific instructions.

**Table 3. Flushing hole sizes.**

Valve size DN (NPS)	Thread size
80 (3)	G1/2"
100 (4)	G1/2"
150 (6)	G1/2"
200 (8)	G3/4"
250 (10)	G3/4"
300 (12)	G1"
350 (14)	G1"
400 (16)	G1"
450 (18)	G1"
500 (20)	G1"
600 (24)	G1"

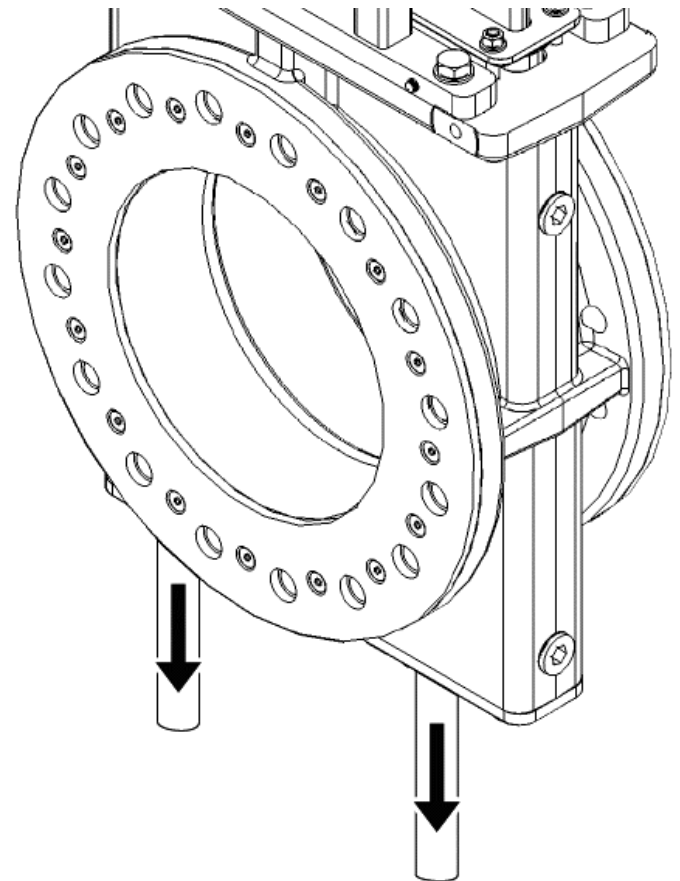
The concept of flushing is to ensure the valve does not jam due to accumulation of medium solids in the valve body. Flushing line or drain line is also required if the medium is harmful to people, environment or other components nearby. In other cases, the flushing connections can be opened to prevent valve body from clogging up. Dirty reclaim service water is usually clean enough to accomplish the water flush, if clean water is not readily available.

Larger diameter valves can have additional flushing connection to ensure good flushing. Flushing connection are on the sides, bottom or on the face of the valve. One or more flushing connection can be used in the following flushing examples.

A flow indicator can be installed in the flush line for easier function check-out.

### Example 1, free drain

The process medium is drained from both sides of the valve through the flushing ports at the bottom. Remove the plugs from the ports and if necessary, add piping to a safe location.



**Figure 8. Flushing example 2.**

### Example 2, flushing through with water

The water is supplied to one side and drained from the other side of the valve. Supply can be from top and or bottom of the valve. Optionally there can be two drains for the flushing water.

It is necessary to have a shut-off valve on the upstream or supply side of the flush water line. This can be located anywhere but is usually near to the valve. Without the shut-off valve the flushing water will run continuously.

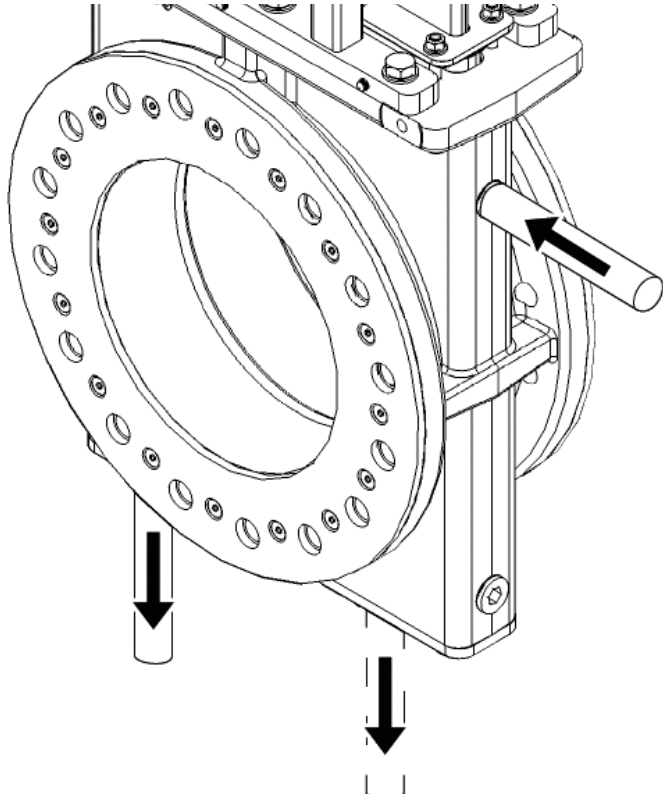


Figure 9. Flushing example 2.

Read the flushing operation instructions for more information.

## 5 Valve commissioning and decommissioning

Before the valve is operated within the pipeline, ensure it has been installed in accordance with this manual and applicable safety regulations.








The following must also be ensured:

- Parameters on the type plate are suitable for the process and environment
- The valve is used for the purpose specified at the time of sales
- Required gate guards and other accessories are installed
- Possible explosive conditions have been considered

When a valve is decommissioned, dispose the valve parts and electric/pneumatic/hydraulic devices (actuators) according to the local regulations and the instructions given by the part or device manufacturer. Collect and dispose dangerous process media, so that people and environment are not endangered. Follow the local regulations.

## 6 Servicing and maintenance

### 6.1 General maintenance and checks

	 <b>WARNING!</b>
	Unexpected start-up hazard. De-energize actuators before maintenance. Especially pneumatic actuators equipped with a mechanical spring can cause injury to people and equipment if cylinder actuates unintentionally.
	Crushing hazard. Keep your hands and feet clear of moving parts. De-energize actuators before maintenance.
	 <b>CAUTION!</b>
	Depressurize, empty and cool down the valve before any maintenance work. Valve surface can be hot. Isolate the valve completely from the process and follow the factory safety regulations.
	Lifting equipment must be used for valves weighing over 25 kg (55 lbs).
	Do not step on a valve installed in horizontal or angled position.

Only personnel with appropriate training are allowed to service the valves. For actuator service instructions consult the manufacturer's documentation supplied with the valve.

Check the condition of the valve regularly. When the valve is tight and it actuates flawlessly, lubricating is the only mandatory maintenance task. Periodic inspections should be done as valves may wear over time depending on conditions and process.

#### Scheduled maintenance

Include the valves in your factory maintenance program. Maintenance tasks and service intervals are offered as a guideline in Table 4. Schedules will vary with applications.

**Table 4. Maintenance schedule.**

Maintenance task	Frequency & advice
Do a leakage inspection	Regularly. Refer to <i>Troubleshooting</i> .
Lubricate the valve	After every 50 cycles. More often if valve is operated rarely. Refer to chapter 6.1.3.
Lubricate the actuator stem	Every six months. Read the manufacturer's instructions.
Run an open/close cycle	Suggested once a month for smooth and reliable operation.
Examine the flushing and drainage	Every two months.
Clean the gate	Every two months. Reduces the ring sleeve and gland packing seal wear.
Examine the gate for erosion	Every two months.
Examine the valve for erosion and wear	Every six months.

#### Spare parts

To ensure correct and quick delivery of spare parts, the order must contain at least the following information:

- Serial number
- Valve type code
- Spare part name and quantity (example: Ring sleeve, 2 pieces)

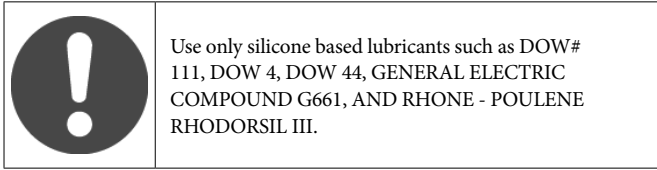
You can order the spare parts from Valmet Flow Control, distributors or agents. Contact information is available at [www.valmet.com/flowcontrol](http://www.valmet.com/flowcontrol).

It is recommended to keep the spare parts of Table 5 available at your factory warehouse. Part numbers refer to *Mechanical structure*. Information regarding wearing components that are not supplied as Flowrox spare parts are also in *Mechanical structure*.

**Table 5. Spare part list.**

Part	Part number	Quantity/valve
<b>Body assembly</b>		
Ring sleeve (sold as set/pair)	1	1
Packing seal	9	-
Sealing strip	21	-
<b>Actuator</b>		
Sealing kit for hydraulic or pneumatic actuator	-	1

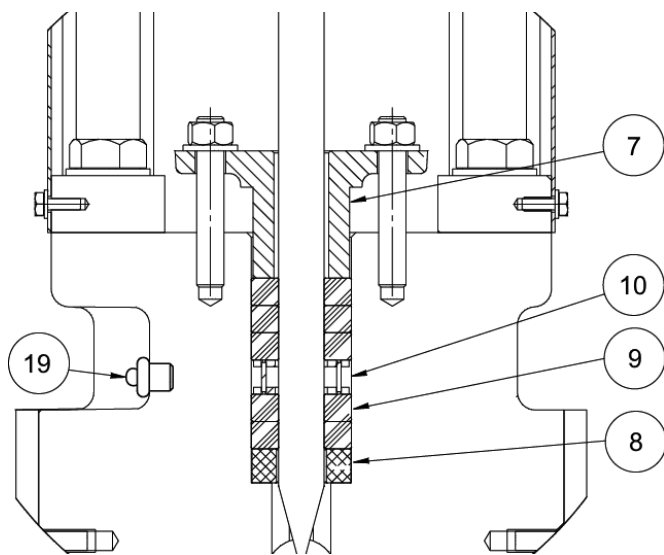
## Lubrication



Flowrox gate valves have grease nipples on both sides of the valve body. Valves are lubricated when assembled - therefore first lubrication should not be required unless the valves have been in stock for a longer time. For dry material handling, lubrication might be limited or forbidden.

Hydrocarbon based greases cannot be used to lubricate these valves as the elastomer ring sleeves will swell and disintegrate.

Lubricate both sides of the valve approximately every 50 cycles, or after long periods of infrequent cycling. Please notice that even when the lubricant is inert it may disturb a sensitive process.



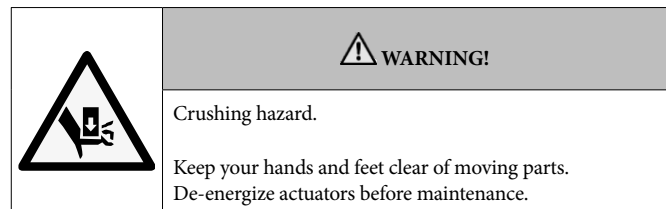
**Figure 10. Gland packing seal.**

- 7. Gland retainer
- 8. Gland bush
- 9. Packing seal
- 10. Grease box
- 19. Grease nipple

## 6.2 Changing the gland packing seal

Follow these instructions if you are to change the packing seal while the valve is in line. The actuator, tower, and gate are removed as one package to get more workspace. Refer to *Changing the ring sleeves* or *Valve dismantling* if further service is required as well.

Part numbers refer to *Mechanical structure*.



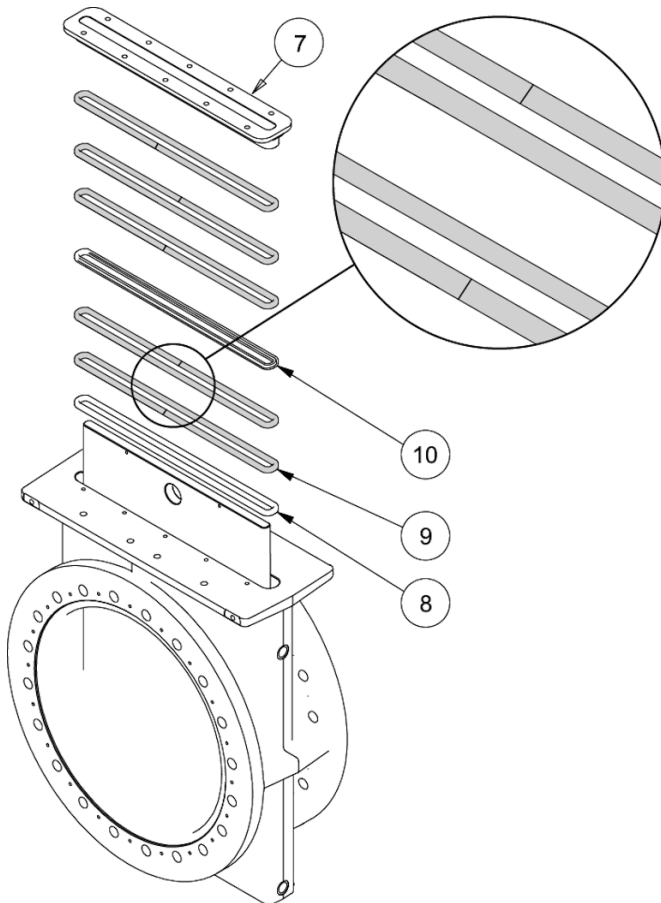
### Removing the gland packing seal

1. Depressurize and drain the pipeline.
2. Remove the guards.
3. Stroke the valve to fully open position and inspect the gate for deep scars or transformation. If damaged, it must be replaced. A damaged gate can shorten the lifetime of the gland packing and ring sleeves.
4. Stroke the valve to fully closed position.
5. Disconnect automatic (electric, pneumatic or hydraulic) actuator from power supply to prevent injuries.
6. Remove the clevis pin and retaining rings.
7. Remove any accessories like limit switches if they interfere with the removal of the tower.
8. Lift the actuator and the tower aside. Do not remove the gate.
9. Remove the gland retainer (7).
10. Remove the old packing seals (9) and the grease box (10) from the cavity.
11. Clean all solids and medium from the cavity.



## Installing the gland packing seal

1. Install the gland bushing (8).
2. Install the first layer of new packing seal strip (9) on the gland bush, placing the joint along the long side.
3. Make sure that the joint is continuous, and the ends are not overlapping. Gently press the packing strip so that it rests evenly on the gland bush.
4. When installing the second packing seal, put the seal joint on the opposite side of the gate.



**Figure 11. Installing gland packing seal.**

5. Install the grease box (10) in the cavity.
6. Install the rest of the new packing seals in the cavity. Place the joints on the opposite side of gate as in the previous seal.
7. Install the gland retainer (7) but leave the nuts loose.
8. Install the actuator and tower (3). Use the tightening torque in Table 6.
9. Stroke the valve manually until the clevis hole is aligned with the hole in the gate.
10. Install the clevis pin and the retaining rings.
11. Tighten the gland retainer nuts (13) gradually in a crosswise sequence. Over tightening can shorten the packing seal lifetime.



Use only silicone based lubricants such as DOW# 111, DOW 4, DOW 44, GENERAL ELECTRIC COMPOUND G661, AND RHONE - POULENE RHODORSIL III.

12. Lubricate the valve from the grease nipples (19) as instructed in *Lubrication*.
13. Re-install all removed accessories like limit switches.
14. Reconnect the automatic actuator to the power supply.
15. Run a few test strokes before the pipeline is re-pressurized.
16. If the gland packing starts to leak after the pipeline is pressurized, re-tighten it and check that it is tightened evenly.



### ! WARNING!

Unexpected start-up hazard.

Disconnect and de-energize actuators before maintenance. Especially pneumatic actuators equipped with a mechanical spring can cause injury to people and equipment if cylinder actuates unintentionally.

17. Install guards (23).

## 6.3 Changing the ring sleeves

To change the ring sleeves, the valve must be removed from the pipeline. Refer to *Valve dismantling* if further service is required as well. Part numbers refer to *Mechanical structure*.




### ! WARNING!

Multiple hazards.

Pressurized medium in the pipeline can cause high pressure injection, scalding, corrosion and irritation.

Do not disconnect a pressurized valve from a pipeline.

1. Depressurize and drain the pipeline.
2. Stroke the valve to fully OPEN position.
3. Disconnect automatic (electric, pneumatic, or hydraulic) actuator from power supply to prevent injuries.
4. Disconnect flushing pipeline from the valve if the flushing is installed.
5. Remove the flange connection bolts and lift the valve to a suitable working surface.

	Lifting equipment must be used for valves weighing over 25 kg (55 lbs).
--	---

6. Remove the ring sleeve retainers (6).
7. Lift the ring sleeves (1) out from the valve body and inspect for visible damage such as cuts, slits or erosion grooves. Depressions and evident flat spots are also to be taken as signs of damage.
8. Clean gate (4) and inspect it for deep scars or transformation and replace it if damaged. A damaged gate can shorten the lifetime of the gland packing and ring sleeves.
9. Clean the valve body.
10. Apply a thin layer of recommended silicone-based lubricant to the sealing lip and to the outer face of the new ring sleeves.
11. Insert the sleeves into the valve body, centering the ring sleeve within the bore. Grease can also be applied on the inside of the body.
12. Reassemble the ring sleeve retainers (6).
13. Leave the valve to OPEN position until it is installed and follow the *storage* instructions if the valve is placed to stock.

## 6.4 Valve dismantling

Follow these instructions if you are to do full overhaul on the valve. Part numbers refer to *Mechanical structure*.

### Removing the actuator, gate, and tower

1. Remove the valve from the pipeline as instructed in the earlier chapter 7.3. Point1-5
2. Loosen the gland retainer nuts (13), Lift the actuator, gate, and tower off.
3. To detach the gate from the actuator stem, remove the clevis pin retaining ring and the clevis pin from the clevis.
4. Clean the gate (4) and inspect it for deep scars or transformation and replace if damaged. A damaged gate can shorten the lifetime of the gland packing and ring sleeves.
5. Remove the clevis.
6. Disconnect the actuator from the tower.
7. Refer to actuator manufactures' instructions for actuator sealing replacement or other maintenance work.

## Dismantling the valve body

1. The actuator, gate and tower must be removed. See Section 6.4.1
2. Remove the ring sleeve retainers (6). from both sides of the body.
3. Remove the ring sleeves (1) from the valve body and inspect for visible damage such as cuts, slits or erosion grooves. Depressions and evident flat spots are also to be taken as signs of damage. Change ring sleeves if damaged.
4. Remove the gland retainer (7).
5. Remove the old packing seal and the grease box from the cavity.
6. Clean the valve body
7. Follow the next instruction, whichever applies:
8. If the valve will be taken into use again, follow the assembly instruction. (Ref 6.5)
9. If valve will be stored for later use, see the instruction on storage (ref 3)
10. If valve will be disposed or decommissioned, See or refer to section (5.1)

## 6.5 Valve assembly

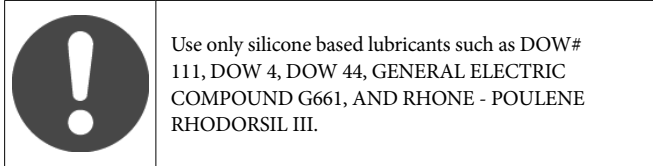
Follow the general tightening torques in Table 6, when specific tightening instructions are not given in this document or in other supplied documentation. Part numbers in these assembly instructions refer to *Mechanical structure*.

**Table 6. General tightening torques.**

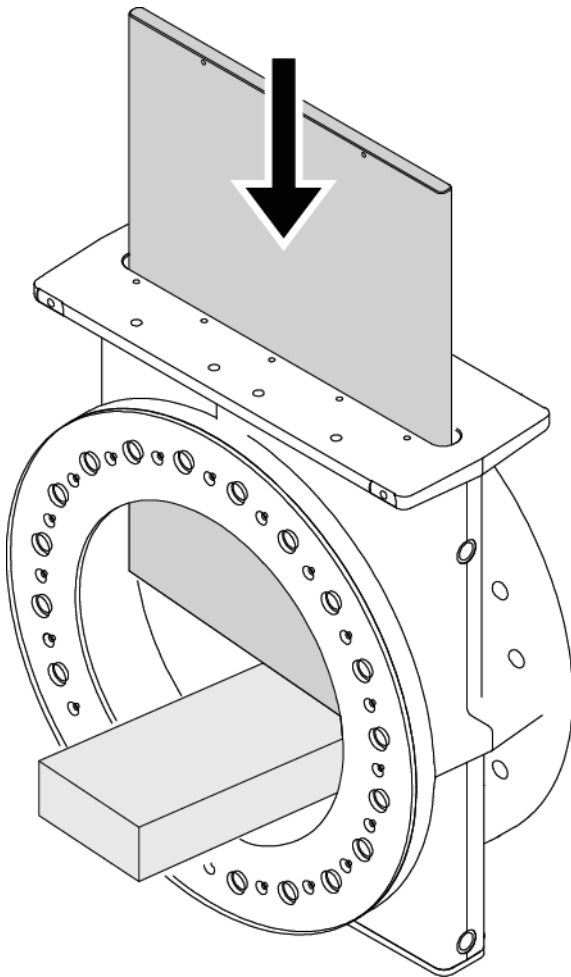
Size	Tightening torques Nm (ft-lbs)	
	Bolt strength class (lubrication conversion factor 0,86)	
	8,8	A4-80
M6	8 (6)	8 (6)
M8	21 (15)	19 (14)
M10	40 (30)	38 (28)
M12	70 (51)	65 (48)
M26	169 (125)	161 (119)
M20	331 (244)	313 (231)
M24	572 (422)	541 (399)

## Valve body, gate, and gland packing assembly

1. Lay the valve body (2) on a suitable work surface in vertical position. Ensure that the body is well supported.
2. Insert a piece of timber in the bore as shown in Figure 12. It prevents the gate from dropping into the body the body.



3. Apply a thin layer of grease on the gate (4)
4. Insert the gate into the valve body so that it rests on piece of timber



**Figure 12. Installing the gate to the valve body.**

5. Install the gland bush.
6. Install the first layer of new packing seal strip on the gland packing bush, placing the joint along the long side. Check that the joint is continuous, and the ends are not overlapping. Gently press the packing strip so that it rests

evenly on the gland bush.

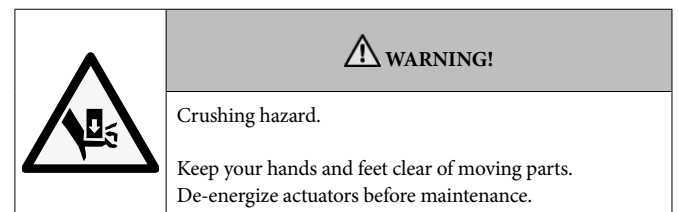
7. Install the second layer of packing seal, ensure that the seal joint is on the opposite side of the gate (4) and not stacked in the same exact location as the previous layer.
8. Install the grease box (10) in the cavity.
9. Install the rest of the new packing seals in the cavity. Place the joints on the opposite side of gate as in the previous seal.
10. Install the gland retainer (7), but do not tighten the nuts.
11. Continue to the tower and actuator assembly in the next chapter.

## Tower and actuator assembly

1. After the valve body and gate have been assembled, Install the tower. Tighten the screws (15). Refer to Table 6.
2. Fit the actuator (and possible adapter plate) on the top of the tower (3) using the correct bolts and nuts.
3. Assemble the clevis to the actuator stem.
4. Stroke the actuator manually until the clevis hole is aligned with the hole in the gate.
5. Install the clevis pin and the retaining rings.
6. Tighten the gland retainer nuts (13) gradually in a crosswise sequence. Overtightening can shorten the packing seal lifetime.
7. Continue to test the stroke in the next chapter.

## Adjusting the valve stroke

Only personnel with appropriate training are allowed to energize the valves. Check and adjust the valve stroke if you dismantle the valve or assemble a pneumatic or electric actuator. This is not needed with manual and hydraulic actuators. Refer to the electrical actuator documentation for specific stroke adjustment instructions.



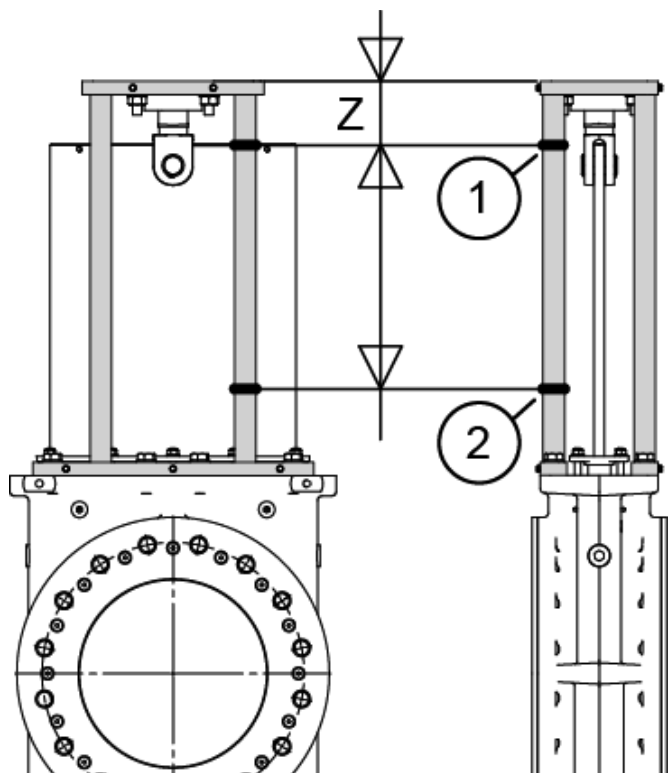
If the tower has already the adjustment limits marked, jump to the electric actuator or pneumatic actuator adjustment.

### Marking the gate travel limits

1. Measure from the top of the tower plate and draw the first mark (1) using the corresponding values in Table 7. Refer to Figure 13.
2. From the first mark (1), measure the corresponding stroke from Table 7.
3. Add the second mark (2) on the tower.

**Table 7. Dimensions for adjusting the valve stroke.**

Valve size DN (NPS)	Dimension Z mm (inch)	Stroke mm (inch)
80 (3)	102 (4,02)	150 (5,91)
100 (4)	95 (3,74)	200 (7,87)
150 (6)	102 (4,02)	250 (9,84)
200 (8)	121 (4,76)	300 (11,81)
250 (10)	126,5 (4,98)	350 (13,78)
300 (12)	122 (4,80)	400 (15,75)
350 (14)	117,5 (4,63)	500 (19,69)
400 (16)	203 (7,99)	550 (21,65)
450 (18)	203 (7,99)	600 (23,62)
500 (20)	203 (7,99)	650 (25,59)
600 (24)	203 (7,99)	750 (29,53)



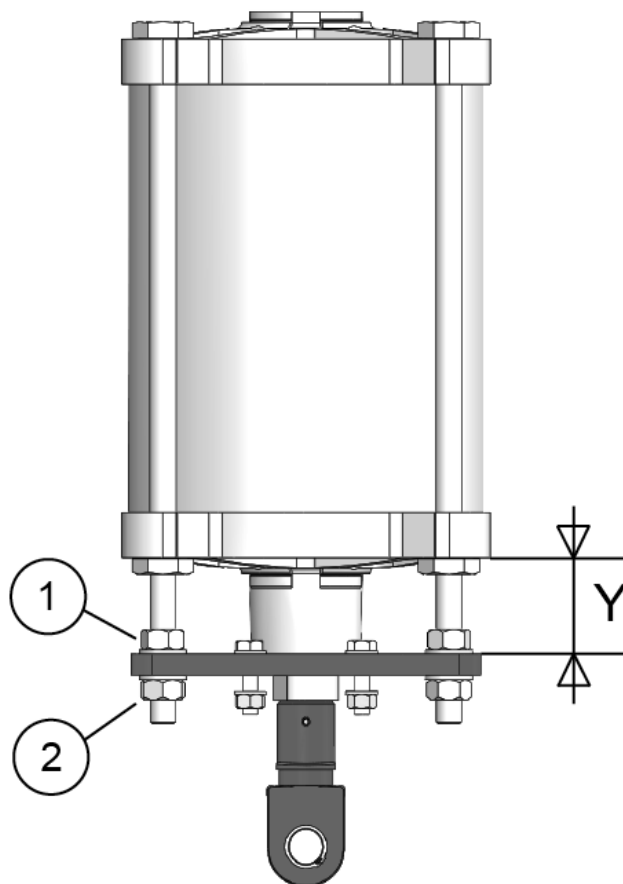
**Figure 13. Adjusting the actuator stroke.**

### Electric actuator adjustment

1. OPEN the valve using the handwheel until the top of the gate is aligned with the first mark (1). Use a level spirit or straight piece of timber to check alignment.
2. Set the Open limit. See OEM actuator's manual for instruction on limit settings.
3. Close the valve until the top of the gate is aligned with the second mark (2). Use a level spirit or straight piece of timber to check alignment.
4. Set the CLOSE limit. See OEM actuator's manual for instruction on limit settings.



### Pneumatic actuator adjustment

1. Stroke the valve open until the cylinder is fully retracted.
2. Use the upper nuts (1) to align the top of the gate to the mark upper mark. Refer to Figure 13. Use a level spirit or straight piece of timber to check alignment.
3. Make sure that the cylinder is parallel to the attachment plate by measuring the dimension Y around the actuator.
4. Lock the actuator position by tightening the lower nuts (2).



**Figure 14. Adjusting the pneumatic actuator stroke.**

## Final assembly and testing

	 <b>WARNING!</b>
	<p>Crushing hazard.</p> <p>Keep your hands and feet clear of moving parts. De-energize actuators before maintenance.</p>

1. Before stroking to the valve automatically, ensure that the adjustments are done as instructed in section 6.5.3.
2. If the valve is with an electric actuator, manually close the valve to halfway (half the stroke) before actuating the valve automatically. This is done to ensure that the valve is opening in the right direction, wiring connections are done properly and prevent any damage to the valve.
3. Stroke the valve with the actuator to fully OPEN and fully CLOSED position to ensure smooth operation and the correct positioning of the gate.
4. Assemble the ring sleeves (1) and the ring sleeve retainers (6).
5. Lubricate the valve grease nipples (19) as instructed in chapter 6.1.3.
6. Install all removed safety guards and other accessories according to the manufacturer's instructions.
7. Run a few open/close cycles and leave the valve open. If the valve operates smoothly it is ready to be installed on the pipeline. Follow the Installation instructions.
8. If the gland packing starts to leak after the pipeline is pressurized, re-tighten it and check that it is tightened evenly.

## 6.6 Troubleshooting

**Table 8. Troubleshooting.**

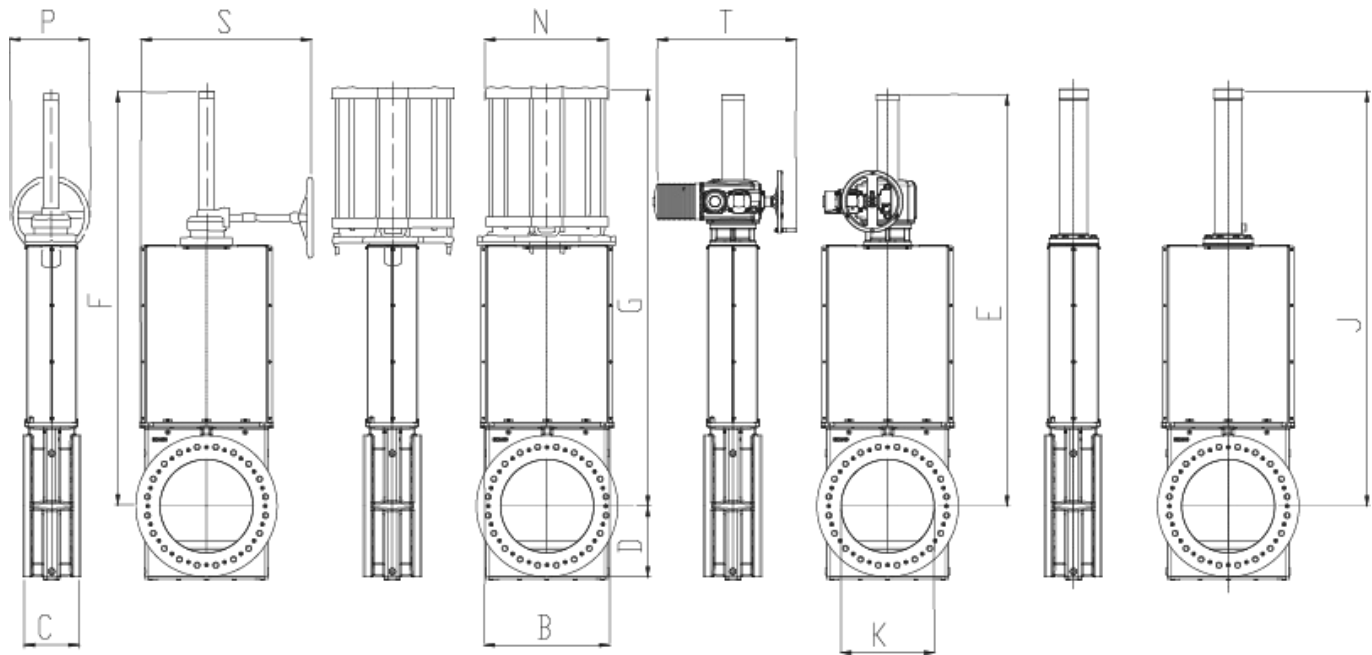
Problem	Possible reason	Action
Leakage from flange connection	Flange connection is loose	Tighten the flange connection bolts to correct torque
	Flange connection bolts are too long	Check if bolts collide with the valve body
	Pipeline flanges and valve are misaligned	Check that the flanges are parallel and concentric to the valve

Leakage from gland packing	Gland retainer nuts are loose or tightened unevenly	Tighten gland retainer nuts to required torque
	Worn out gland packing	Change gland packing
	Worn out gate	Check and change damaged gate
	Gland packing seal is not installed properly	Re-install gland packing
Valve does not open/close or valve is not tight	Fault in actuator, limit switch or control system	Check and fix actuator operation
	Clogged up with solids	Clean gate and body cavity. Check or install flushing
	Damaged gate, ring sleeve or gland packing	Check and change damaged parts
Valve does not open/close smoothly	Insufficient lubrication	Lubricate valve and increase scheduled lubrication. Lubricate the actuator.
Opening/closing force too high*	Insufficient lubrication	Lubricate valve and increase scheduled lubrication. Lubricate the actuator.
	Gland retainer nuts too tight	Loosen nuts to required torque
	Damaged gate, ring sleeve or gland packing	Check and change damaged parts
Ring sleeve lifetime is short	Insufficient flushing	Check flushing flow and pressure or install flushing
	Insufficient lubrication	Increase scheduled lubrication
	Unsuitable ring sleeve material for process	Check with Valmet Flow Control
	Damaged gate	Check gate for scrapes and bending and change if damaged

\* Manually operated valves are actuated with normal hand force

## Appendix A: Main measurements of valves

Sizes DN80-600



Valve size (DN)	B	C	D	E	F	G	J	K	N	P	S	T	Weight (kg)			
				E	MG	A	H		A	MG		E	E	MG	A	H
80	245	175	110	990	813	872	757	80	183	300	410	513	57	55	54	46
100	245	181	130	1051	875	1023	869	100	236	300	410	513	67	65	72	59
150	315	184	160	1173	1047	1252	1041	150	270	500	445	513	108	120	128	96
200	375	184	185	1335	1240	1450	1242	200	340	500	475	537	150	160	194	135
250	480	226	220	1475	1390	1656	1423	250	450	500	528	724	256	252	332	230
300	540	242	255	1642	1506	1592	1557	300	610	600	563	724	322	345	457	296
350	880	251	385	2090	2057	2036	1992	350	600	400	886	731	855	805	1055	820
400	930	286	410	2240	2158	2214	2132	400	710	400	910	795	1035	970	1345	975
450	1070	311	465	2335	2253	2359	2277	450	710	400	1081	795	1345	1280	1685	1285
500	1120	373	480	2420	2417	2461	2412	500	812	400	1129	795	1680	1640	2055	1615
600	1270	373	550	2734	2708	2752	2772	600	812	400	1204	919	2130	2100	2565	2140

E = Electric, MG = handwheel with gearbox, A = pneumatic, H = hydraulic

Valve size NPS	B	C	D	E	F	G	J	K	N	P	S	T	Weight (lbs)			
				E	MG	A	H		A	MG		E	E	MG	A	H
3	9,6	6,9	4,3	39	32	34,3	29,8	3,1	7,2	11,8	16,1	20,2	126	121	119	101
4	9,6	7,1	5,1	41,4	34,4	40,3	34,2	3,9	9,3	11,8	16,1	20,2	148	143	159	130
6	12,4	7,2	6,3	46,2	41,2	49,3	41	5,9	10,6	19,7	17,5	20,2	238	265	282	212
8	14,8	7,2	7,3	52,6	48,8	57,1	48,9	7,9	13,4	19,7	18,7	21,1	331	353	428	298
10	18,9	8,9	8,7	58,1	54,7	65,2	56	9,8	17,7	19,7	20,8	28,5	564	556	732	507
12	21,3	9,5	10	64,6	59,3	62,7	61,3	11,8	24	23,6	22,2	28,5	710	761	1008	653
14	34,6	9,9	15,2	82,3	81	80,2	78,4	13,8	23,6	15,7	34,9	28,8	1885	1775	2326	1808
16	36,6	11,3	16,1	88,2	85	87,2	83,9	15,7	28	15,7	35,8	31,3	2282	2138	2965	2149
18	42,1	12,2	18,3	91,9	88,7	92,9	89,6	17,7	28	15,7	42,6	31,3	2965	2822	3715	2833
20	44,1	14,7	18,9	95,3	95,2	96,9	95	19,7	32	15,7	44,4	31,3	3704	3616	4530	3560
24	50	14,7	21,7	107,6	106,6	108,3	109,1	23,6	32	15,7	47,4	36,2	4696	4630	5655	4718

Dimensions and weight are for guidance only – detailed drawings are available on request.

## Appendix B: Type code

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
SKH	0100	B010	J	00	S1	N	C	B	A	A

1. Sign	Product type
SKF	Slurry Knife Gate Valve Flanged (LUGGED)
SKW	Slurry Knife Gate Valve Wafer (SEMI-LUGGED)
SKH	Slurry Knife Gate Valve High Pressure (LUGGED)

2. Sign	Body size	
0050	DN 50	2"
0080	DN80	3"
0100	DN100	4"
0125	DN125	5"
0150	DN150	6"
0200	DN200	8"
0250	DN250	10"
0300	DN300	12"
0350	DN350	14"
0400	DN400	16"
0450	DN450	18"
0500	DN500	20"
0600	DN600	24"
0650	DN650	26"
0700	DN700	28"
0750	DN750	30"
0800	DN800	32"
0900	DN900	36"
1000	DN1000	40"
1100	DN1100	44"
1200	DN1200	48"
1350	DN1350	54"
1400	DN1400	56"
1500	DN1500	60"

3. Sign	Working pressure
B004	4 bar
B006	6 bar
B007	7 bar (Only AS Table D and BS Table D)
B010	10 bar
B014	14 bar (Only AS Table E and BS Table E)
B020	20 bar

For further information on the new type code on valve and actuators, see the product Technical bulletin.

4. Sign	Flange drilling
J	PN 10 EN 1092
K	PN 16 EN 1092
L	PN 25 EN 1092
M	PN 40 EN 1092
C	ANSI 150 (ASME B16.5)
D	ANSI 300 (ASME B16.5)
B	BS TABLE D
A	AS TABLE D
E	AS TABLE E
R	JIS 10K
S	JIS 16K
Y	Other

5. Sign	Body material
00	Grey Cast iron EN 1561-GJL-250
01	Ductile Iron EN 1563-GJS-450
02	AISI 316 (EN 1.4408 /A351 CF8M)
08	Ductile Iron EN 1563-GJS-500
0Y	Other

6. Sign	Gate material
S1	AISI 316
S2	Duplex 2205
S3	Duplex 2101
S4	17-4PH*
S5	ALLOY C-276
S6	DUPLEX 2507
S7	AISI 316L
S8	AISI 904L

7. Sign	Gate coating
N	None

8. Sign	Ring sleeve / seat
C	NR Natural rubber
B	EPDM Ethylene Propylene
D	NBR Nitrile

9. Sign	Gate coating
B	EPDM Ethylene propylene
T	PTFE gland packing (SKF700-1500 and SKH series)

10. Sign	Ring sleeve material
A	FEZN (Standard)
C	All Stainless steel, A4-80

11. Sign	Ring sleeve material
A	Standard EN 1092-1/A Flat Face
B	EN 1092-1/B1 Raised Face (Only SKH series)
R	ASME B16.5 RF, Raised Face (Only SKH series)

## APPENDIX C: General safety warnings

### Lifting

1. Always use a lifting plan created by a qualified person to lift this equipment. Lifting guidance is provided in this IMO (Installation, Maintenance and Operation manual) to assist in lifting plan development. Think about the point center of gravity (CG) of the equipment being lifted. Make sure the CG is always under the central lifting point.
2. Valves may be equipped with lifting threads on the body or on the flanges. These are which are intended for use with the lifting plan.
3. Use only correct and approved lifting devices. Ensure that lifting devices and straps are securely attached to the equipment prior to lifting.
4. Check, that lifting devices are not damaged and in good condition with a valid check stamp prior to use.
5. Workers must be trained for lifting and handling valves.
6. Never lift an assembly by the instrumentation (solenoid, positioner, limit switch, etc.) or by the instrumentation piping. Straps and lifting devices should be fitted to prevent damage to instrumentation and instrumentation piping. Failure to follow the lifting guidance provided may result in damage and personal injury from falling objects.

### Work activities on the valve

1. Wear your personal safety equipment. Personal safety equipment includes but is not limited to protective shoes, protective clothing, safety glasses, helmet, hearing protection and working gloves.
2. Always follow the local safety instructions in addition to the Valmet instructions. If Valmet instructions conflict with local safety instructions, stop work and contact Valmet for more information.
3. Before beginning service on the equipment, make sure that the actuator is disconnected from any kind of power source (pneumatic, hydraulic, and/or electric), and no stored energy is applied on the actuator (compressed spring, compressed air volumes, etc.). Do not attempt to remove a spring return actuator unless the stop screw is carrying the spring force.
4. Make sure that there is a LOTOTO (Lock Out / Tag Out / Try Out) procedure in place for the system in which the valve is installed and strictly follow it.
5. Always make sure that the pipeline is depressurized and in ambient temperature condition before maintenance work is started.
6. Keep hands and other body parts out of the flow port when the valve is being serviced and the actuator is connected to the valve. There is a high risk of serious injury to hands and/or fingers due to malfunction if the valve suddenly starts to operate.
7. Beware of Disc & Ball movement even when the valve is disassembled. Discs and balls may move simply due to the weight of the part or change in position of the valve. Keep hands or other body parts away from locations where they may be injured by movement

### General disclaimers

#### Recieve, handle and unpacking

1. Respect the safety warnings above!
2. Valves are critical components for pipelines to control high pressure fluids and must therefore be handled with care.
3. Store valves and equipment in a dry and protected area until the equipment is installed.
4. Do not exceed the maximum storage temperatures given in the IMO (installation, maintenance, and operating instructions).
5. Keep the original packaging on the valve as long as possible to avoid environmental contamination by dust, water, dirt, etc.
6. Remove the valve endcaps just before mounting into the pipeline.
7. FOR YOUR SAFETY IT IS IMPORTANT THE FOLLOWING PRECAUTIONS BE TAKEN PRIOR TO REMOVAL OF THE VALVE FROM THE PIPELINE OR BEFORE ANY DISASSEMBLY: Be sure you know what fluid is in the pipeline. If there is any doubt, confirm with the proper supervisor.



- Wear any personal protective equipment (PPE) required for working with the fluid involved in addition to any other PPE normally required.
- Depressurize the pipeline, bring to ambient temperature, and drain the pipeline fluid.
- Cycle the valve to relieve any residual pressure in the body cavity.
- After removal but before disassembly, cycle the valve again until no evidence of trapped pressure remains.
- The butterfly valve's offset shaft creates greater disc area on one side of the shaft. This will cause the valve to open when pressurized from the preferred direction without a locking handle or an actuator installed.
- **WARNING: DO NOT PRESSURIZE THE BUTTERFLY VALVE WITHOUT A HANDLE OR AN ACTUATOR MOUNTED ON IT!**
- **WARNING: DO NOT REMOVE A HANDLE OR AN ACTUATOR FROM A BUTTERFLY VALVE UNDERPRESSURE!**
- Before you install the butterfly valve in or remove it from the pipeline, cycle the valve closed. Butterfly valves must be in the closed position to bring the disc within the face to face of the valve. Failure to follow these instructions will cause damage to the valve and may result in personal injury.

## Operating

8. The type plate (nameplate, or engraved markings) on the valve gives the information of max. process conditions to the valve.
9. (For soft seats) The practical and safe use of this product is determined by both the temperature and pressure ratings of the seat and body. Read the type plate and check both ratings. This product is available with a variety of seat materials. Some seat materials have pressure ratings that are lower than the body ratings. All body and seat ratings are dependent on the valve type, size and material of the body and seat. Never exceed the marked rating.
10. Temperatures and pressures must never exceed values marked on the valve. Exceeding these values may cause uncontrolled release of pressure and process fluid. Damage or personal injury may result.
11. The operating torque of the valve may rise over time due to wear, particles or other damage the seat. Never exceed the actuator torque preset values (air supply, position). Application of excessive torque may cause damage to the valve.
12. Valmet valves typically are designed to be used in atmospheric conditions. Do not use valves under external pressurized conditions unless specifically designed and explicitly marked for this service.
13. Avoid Pressure shocks or water hammer. Systems with high pressure valves should be equipped with a bypass to reduce the differential pressure before opening the valve to avoid pressure shock.
14. Avoid thermal shock. High temperature, Low temperature and cryogenic valves should be operated in a way that limits the rate of increase or decrease in temperature. The valve should be thermally stabilized before being pressurized.
15. Materials of the valve are carefully selected for the process conditions. Changes to the process media can have a major impact on function and safety of the valve. Always confirm the materials are suitable for the service prior to installation.
16. As the use of the valve is application specific, a number of factors should be taken into account when selecting a valve for a given application. Therefore, some situations in which the valves are used are outside the scope of this manual.
17. It is the end user's responsibility to confirm compatibility of the valve materials with the intended service, however if you have questions concerning the use, application, or compatibility of the valve for the intended service, contact Valmet for more information.
18. Never use a valve with enriched or pure oxygen if the valve is not explicitly designed and cleaned for oxygen. Selected materials and design have a major impact on the safety to operate the valve with oxygen.
19. Valves intended for use in or with explosive atmospheres must be equipped with a grounding device and marked according ATEX (or equivalent international standards).
20. Manual handles are available for specific butterfly valve sizes and maximum line pressures. Do not operate a valve with a handle or wrench outside the size and pressure limits stated in the IMO. High line pressure may create a large enough force to pull the handle from the operator's hands. Damage or personal injury may result.

## Maintenance

14. Respect the safety warnings above!
15. Plan service and maintenance actions, that spare parts, lifting devices and service personnel is available. Maintain the valve within the recommended minimum maintenance intervals or within the recommended maximum operating cycles.

16. Always make sure that the valve and the pipeline is depressurized before starting any kind of maintenance work at a valve.
17. Always check the position of the valve before starting maintenance work. Follow the Lock out /tag out (LOTO) rules at the site before starting any maintenance activity.
  - See IMO for the correct stem position.
  - Consider that the positioner may give the wrong signals.
18. Sealing materials (soft sealing parts) should be changed when the valve is maintained. Always use original equipment manufacturers (OEM) spare parts to ensure proper performance of the repaired valve.
19. All pressure containing parts must be inspected visually for damage or corrosion. Damaged parts must be replaced.
20. Valve pressure bearing parts and all internals must be inspected for corrosion or erosion which may result in reduced wall thickness on pressure bearing parts. Damaged pressure bearing parts must be replaced with original equipment manufacturer's (OEM) replacement parts or repaired to factory specifications by an authorized Valmet service partner in order to maintain the warranty.
21. Do not use sharp tools, grinding machines, or files to work on functional surfaces such as sealing, seating or bearing surfaces as this can damage these surfaces.
22. Check the condition of sealing surfaces on the seats, closure device (disc, ball, cage, plug, etc.), body and body cap. Replace parts if there are significant wear, scratches, or damage.
23. Check the wear of bearings and bearing contact surfaces on the shaft and replace damaged parts if necessary.
24. Do not weld on pressure bearing parts without an ASME and PED qualified procedure and personnel.
25. Pressure bearing parts of valves in high temperature applications must be carefully examined for the effects of material creep and fatigue.
26. Make sure that the valve is positioned in the correct flow direction into the pipeline.
27. If the valves are marked to be suitable for explosive atmospheres, the correct function of the discharging device must be tested before returning to service.
28. Always work in a clean environment. Avoid getting particles inside the valve due to machining, grinding, or welding nearby.
29. Never store a maintained valve without flow port protection.
30. When pressure testing valve seats, never exceed the maximum operating pressure of the system or the maximum shut-off pressure marked on the valve identification plate.
31. Actuator mounting and unmounting:
  - Before installing the actuator on to the valve, be sure the actuator is properly indicating the valve position. Failure to assemble these to indicate correct valve position may result in damage or personal injury.
  - When installing or removing a linkage kit, best practice is to remove the entire linkage assembly, including couplings which may fall off the valve during lifting or when position changes.
  - Mounting sets have been designed to support the weight of the Valmet actuator and recommended accessories. Use of the linkage to support additional equipment or additional weight such as people, ladders, etc. may result in equipment damage or personal injury.
32. The valve should be installed between flanges using appropriate gaskets and fasteners that are compatible with the application, and in compliance with applicable piping codes and standards. Center the gaskets carefully when fitting the valve between the flanges. Do not attempt to correct pipeline misalignment by means of the flange bolting.
33. Repairs on valves for special service like Oxygen, Chlorine, and Peroxide, have special requirements.
  - Parts must be cleaned appropriate to the service and protected from contamination prior to assembly.
  - Assembly areas and tools must be clean and dry to prevent contamination of the parts during assembly.
  - Test equipment must be clean and dry to prevent contamination during testing. This includes the test equipment internals that may allow particles or other contamination into the test fluid during the test.
  - Lubrication shall be used only if specifically required in the instructions. Where lubrication is required, the lubricant must be approved for the service by the end user.



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